

Osserman manifolds and duality principle

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ABSTRACT. Let (M, g) be a pseudo-Riemannian manifold, with curvature tensor R . The Jacobi operator R_X is the symmetric endomorphism of $T_p M$ defined by $R_X(Y) = R(Y, X)X$. In Riemannian settings, if M is locally a rank-one symmetric space or if M is flat, then the local isometry group acts transitively on the unit sphere bundle SM and hence the eigenvalues of R_X are constant on SM . Osserman in the late eighties, wondered if the converse held; this question is usually known as the *Osserman conjecture*.

In the last twenty five years many authors have been studied problems which arising from the Osserman conjecture and its generalizations. In the first part of the lecture we will give an overview of Osserman type problems in the pseudo-Riemannian geometry. The second part is devoted to the equivalence of the Osserman pointwise condition and the duality principle. This part of the lecture consists the new results, which are obtained in collaboration with Yury Nikolayevsky and Vladica Andrejić.